IN THE CLAIMS

Prior to examination and calculation of fees, please cancel claims 1-113. Please enter claims 114-145. No new matter has been added and each claim is fully and unambiguously supported in the original specification and drawings.

114. A method of fracturing a subterranean formation comprising the step of pumping a viscoelastic fluid through a wellbore and into a subterranean formation at a pressure sufficient to fracture the formation, wherein said viscoelastic fluid comprises:

a) an aqueous medium;

b) a surfactant selected from the group consisting of amphoteric surfactants, zwitterionic surfactants, and mixtures thereof;

c) a member selected from the group consisting of organic acids, organic acid salts, inorganic salts, and combinations of one or more organic acids or organic acid salts with one or more inorganic salts; wherein said fluid exhibits the property of viscoelasticity; and

d) a mineral acid at a concentration sufficient to reduce the pH of said viscoelastic fluid to about 3 or less.

115. The method of claim 114 wherein the amount of said surfactant is from about 0.5% to about 6% by weight of said fluid.

116. The method of claim 114 wherein said surfactant is a zwitterionic surfactant comprising a quaternary ammonium hydrophilic moiety covalently bonded with an alkyl or a hydroxyalkyl group.

117. The method of claim 114 wherein said surfactant comprises a carboxylate hydrophilic moiety.

118. The method of claim 114 wherein said member comprises an aromatic moiety selected from the group consisting of sulfonic moieties, sulfonate moieties, carboxylic moieties, and carboxylate moieties.

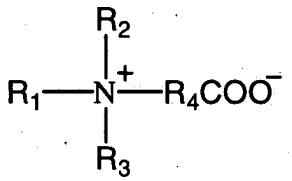
119. The method as claimed in claim 118 wherein said aromatic moiety is selected from the group consisting of salicylate ions and phthalate ions, hydroxynaphthalene carboxylate ions, and mixtures thereof.

120. The method of claim 114 wherein said viscoelastic fluid further comprises a particulate proppant suspended therein.

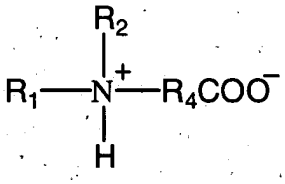
121. The method of claim 114 wherein said viscoelastic fluid further comprises an additive selected from the group consisting of corrosion inhibitors and fluid-loss additives and mixtures thereof.

122. The method of claim 114 wherein said member is present in an amount of from about 0.1% to about 30% by weight, preferably in an amount of from about 0.1% to about 8% by weight.

123. The method of claim 114 wherein said surfactant is represented by the formula (I):



or the formula (II):



wherein R_1 represents alkyl, alkenyl, alkylarylalkylene, alkenylarylalkylene, alkylaminoalkylene, alkenylaminoalkylene, alkylamidoalkylene, or alkenylamidoalkylene, wherein each of said alkyl groups contains from about 14 to about 24 carbon atoms and may be branched or straight chained and saturated or unsaturated, and wherein said alkylene groups have from about 1 to about 6 carbon atoms; R_2 and R_3 are independently aliphatic chains having from about 1 to about 30 carbon atoms, and R_4 is a hydrocarbyl radical with a chain length of about 1 to about 4.

124. The method of claim 123 wherein R_1 is selected from the group consisting of tetradecyl, hexadecyl, and octadecyl.

125. The method of claim 123 wherein R_1 is an alkyl group derived from tallow, coco, soya bean, or rapeseed oil.

126. The method of claim 123 wherein R_2 and R_3 are independently alkyl, alkenyl, arylalkyl, hydroxyalkyl, carboxyalkyl, or hydroxyalkyl-polyoxyalkylene, each having from about 1 to about 10 carbon atoms and preferably are methyl, ethyl, benzyl, hydroxyethyl, hydroxypropyl, carboxymethyl, or carboxyethyl.

127. The method of claim 123 wherein R_1 is $RCONHCH_2CH_2CH_2-$ wherein R is an alkyl group containing from about 14 to about 24 carbon atoms which may be branched or straight chained and which may be saturated or unsaturated and R_2 and R_3 are each beta-hydroxyethyl.

128. The method of claim 127 wherein R_2 is beta-carboxyethyl and R_4 is ethylene.

129. The method of claim 114 wherein said surfactant is selected from the group consisting of dihydroxyethyl glycinates, alkenylamidoalkyl betaines, and amphoteric imidazoline-derived dipropionates, most preferably form the group consisting of dihydroxyethyl tallow glycinate and disodium tallowiminodipropionate.

130. The method of claim 114 wherein said surfactant is an alkenylamidoalkyl betaine.

131. The method of claim 130 wherein said surfactant is oleamidopropyl betaine.

132. The method of claim 129 wherein the fluid comprises from about 0.5% to about 6% of the surfactant and from about 0.1% to about 6% of a combination of a member selected from the group consisting of p-toluene sulfonate, naphthalene sulfonate, chlorobenzoic acid, salicylic acid and phthalic acid, with a member comprising one or more water-soluble ammonium salts.

133. The method of claim 131 wherein the fluid comprises from about 0.5% to about 6% of the surfactant and from about 0.1% to about 6% of a combination of a member selected from the group consisting of p-toluene sulfonate, naphthalene sulfonate, chlorobenzoic acid, salicylic acid and phthalic acid, with a member comprising one or more water-soluble ammonium salts

134. A method of fracturing a subterranean formation comprising the step of pumping a viscoelastic fluid through a wellbore and into a subterranean formation at a pressure sufficient to fracture the formation, wherein said viscoelastic fluid comprises:

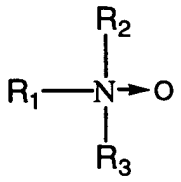
a) an aqueous medium;

b) an amine oxide surfactant;

c) an anionic surfactant containing a hydrophobe having at least 14 carbon atoms; and

d) a mineral acid at a concentration sufficient to reduce the pH of said viscoelastic fluid to about 3 or less.

135. The method of claim 134 wherein said amine oxide surfactant is of formula



wherein R_1 represents alkyl, alkenyl, alkylarylalkylene, alkenylarylalkylene, alkylaminoalkylene, alkenylaminoalkylene, alkylamidoalkylene, or alkenylamidoalkylene, wherein each of said alkyl groups contains from about 14 to about 24 carbon atoms and may be branched or straight chained and saturated or unsaturated, and wherein said alkylene groups have from about 1 to about 6 carbon atoms; and R_2 and R_3 are independently aliphatic chains having from about 1 to about 30 carbon atoms.

136. The method of claim 134 wherein said anionic surfactant is an alkyl sulfate or sulfonate having alkali metal counterions or an alkyl carboxylate, wherein alkyl represents a group that contains from about 14 to about 24 carbon atoms, preferably from 16 to about 22 carbon atoms, which may be branched or straight chained and which may be saturated or unsaturated.

137. The method of claim 134 wherein the weight ratio of amine oxide surfactant to anionic surfactant ranges from about 100:1 to about 50:50.

138. The method of claim 114 wherein said viscoelastic fluid is foamed or energized by the addition of air, nitrogen or carbon dioxide.

139. The method of claim 131 wherein said viscoelastic fluid is foamed or energized by the addition of air, nitrogen or carbon dioxide.

140. The method of claim 134 wherein said viscoelastic fluid is foamed or energized by the addition of air, nitrogen or carbon dioxide.

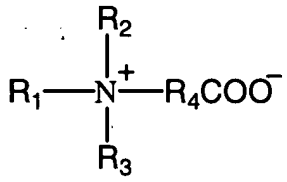
141. A method of fracturing a subterranean formation comprising the step of pumping a viscoelastic fluid through a wellbore and into a subterranean formation at a pressure sufficient to fracture the formation, wherein said viscoelastic fluid comprises:

a) an aqueous medium;
b) a surfactant selected from the group consisting of amphoteric surfactants, zwitterionic surfactants, and mixtures thereof; and
c) a member selected from the group consisting of organic acids, organic acid salts, inorganic salts, and combinations of one or more organic acids or organic acid salts with one or more inorganic salts; wherein said fluid exhibits the property of viscoelasticity;

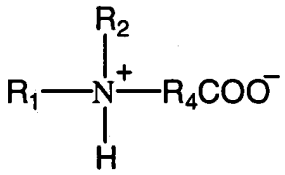
wherein said viscoelastic fluid is foamed or energized by the addition of air, nitrogen or carbon dioxide.

142. The method of claim 140 wherein said surfactant is a zwitterionic surfactant comprising a quaternary ammonium hydrophilic moiety covalently bonded with an alkyl or a hydroxyalkyl group.

143. The method of claim 140 wherein said surfactant is represented by the formula (I):



or the formula (II):



wherein R_1 represents alkyl, alkenyl, alkylarylalkylene, alkenylarylalkylene, alkylaminoalkylene, alkenylaminoalkylene, alkylamidoalkylene, or alkenylamidoalkylene, wherein each of said alkyl groups contains from about 14 to about 24 carbon atoms and may be branched or straight chained and saturated or unsaturated, and wherein said alkylene groups have from about 1 to about 6 carbon atoms; R_2 and R_3 are independently aliphatic chains having from about 1 to about 30 carbon atoms, and R_4 is a hydrocarbyl radical with a chain length of about 1 to about 4.

144. The method of claim 140 wherein said surfactant is an alkenylamidoalkyl betaine.

145. The method of claim 143 wherein said surfactant is oleamidopropyl betaine.

IN THE SPECIFICATION

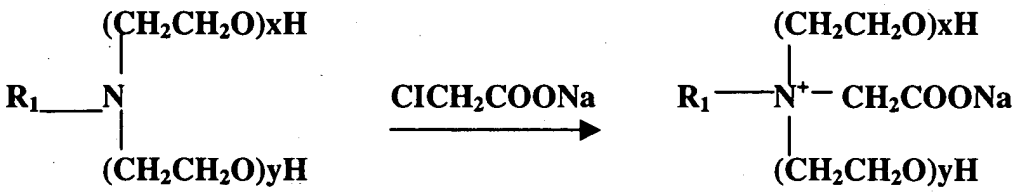
Please amend page 1, first paragraph by replacing it by the following:

This application is a Continuation Application of United States patent Application 10/216,604 filed August 9, 2002, which was a Divisional Application of United States Patent Application 09/612,669 filed July 10, 2000, (now U. S. Pat. 6,482,866) which was a Continuation of United States Patent Application 09/093,131 filed June 8, 1998, now U. S. Pat. 6,258,859 and claims the benefit of the disclosure of United States Provisional Patent Application Serial Nos. 60/049,045, filed on June 10, 1997, and 60/054,455, filed on August 5, 1997.

Please amend the section title, page 3, line 17 to read as follows (this amendment was made to correct an informality during prosecution of the parent application):

BRIEF DESCRIPTION OF THE DRAWINGS

Please amend the formula page 9, bridging lines 18-22 to read as follows (this amendment was made to correct an informality during prosecution of the parent application):



$x + y = 2\sim10$

Clean replacement pages 1, 3 and 9 as well as marked-up versions are attached to this Preliminary Amendment.

Respectfully submitted,

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Date: Oct. 14, 2003

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